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TABLE OF CONTENTS

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ORIGINAL ARTICLES

THE SURGICAL TREATMENT OF PEPTIC ULCER. <i>By P. E. Truesdale, M.D., Fall River, Mass.</i>	135
TREATMENT OF BACK INJURIES WITH SPECIAL REFERENCE TO SPINAL FRACTURES THAT ARE NOT ASSOCIATED WITH CORD SYMPTOMS. <i>By Herman W. Marshall, M.D., Boston.</i>	140
SOME INCIDENTS IN THE LIFE AND MILITARY CAMPAIGNS OF BARON LARREY (1766-1842) <i>By William Pearce Coles, M.D., Boston.</i>	146
THE TECHNIQUE OF CITRATED BLOOD TRANSFUSION. <i>By Henry C. Marble, M.D., Boston.</i>	153

EDITORIALS

SILENT GASTRIC CANCER WITH GENERAL ANASARCA	156
THE UNTILLED FIELDS OF PUBLIC HEALTH	157
MEDICAL NOTES	158

THE MASSACHUSETTS MEDICAL SOCIETY

THE BOSTON MEDICAL LIBRARY	160
HAMPSHIRE DISTRICT MEDICAL SOCIETY	160
NEWS ITEMS	160

MISCELLANY

NOTICES, RECENT DEATHS, ETC.	160
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Original Articles.

THE SURGICAL TREATMENT OF PEPTIC ULCER.*

By P. E. TRUESDALE, M.D., FALL RIVER, MASS.

MANY phases of the subject of peptic ulcer remain unsettled and a growing border of the profession is seeking practical knowledge in regard to it. Both medical and surgical branches of practice treat the disease and both are vitally concerned in all features of its development and control.

Certain facts about peptic ulcer have been rendered from the vast amount of clinical material studied in the operating room and in the laboratory. We know from observation first made at the Mayo Clinic that, contrary to popular belief, about 70% of all peptic ulcers are duodenal or involve the duodenum; that a very small percentage of these occurs in the second portion of the duodenum; that nearly 70% of all gastric ulcers develop in the lesser curvature; that gastric ulcer undergoes malignant degeneration, the exact frequency of which may be open to debate, but the change itself is not disputed. We also know that ulcer of the duo-

denum very rarely degenerates into cancer; that compared to cancer of the stomach the incidence of cancer of the duodenum is about one to forty. We know that syphilitic ulcers of the stomach, usually multiple in number, are not uncommon; that hypertrophy of the pyloric musculature, sometimes obstructive in degree, develops in the presence of peptic ulcer. We know, too, that ulcer of the stomach or duodenum sometimes undergoes spontaneous cure; that its development is arrested, often permanently, by medical treatment; that when manifestations of non-syphilitic ulcer are prolonged, excision by the knife or cautery is the only method of cure.

These have become accepted facts, scarcely necessary to enumerate, yet of vital importance in the study of this fascinating subject, fascinating because perversions of gastric functions are very common and the pathology of the digestive tract affords immense interest to surgeons as well as to internists.

Although considerable progress has been made toward unmistakable recognition of ulcer and the treatment of certain types is well defined, nevertheless, the diversity of thought and activities bearing upon end results is sufficient evidence that our knowledge is incomplete; our investigations unfinished and our de-

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ductions not final. This is inevitable, in a measure, because the etiology of peptic ulcer remains undetermined.

Simple ulcer has been produced experimentally in the stomach and we have learned something about its incidence and selective nature. But the difficulties in producing chronic ulcer have not been surmounted and it is chronic ulcer with which we are confronted in practice. Incipient ulcer of the stomach and duodenum is rarely observed clinically. As a rule the early stage is borne by the patient without appealing for medical aid. Billings has stated that the disease is often latent even in the chronic form, perforations sometimes being the first sign of real trouble.

Acute symptoms of peptic ulcer generally signify acute exacerbation of a lesion that is chronic. Frequently patients fail to remember the exact time of onset of symptoms. As we see them it is very rare that the duration of the ulcer history is less than one year. The average duration of symptoms was found to be 7½ years in a review of 27 cases in which pylorotomy for ulcer was done in this clinic.

The treatment almost universally applied today is medical during the early stages. When medical treatment and rest have been tried for weeks or months and the symptoms fail to yield to such measures or return after short periods of relief, the problem of dealing with the disease falls into the category of surgery. This arrangement works out most satisfactorily because a reasonable trial of medical treatment should be given, and when that fails the potential risks of ulcer from hemorrhage, perforation, and malignant degeneration must not be ignored.

The surgical treatment consists first of all in a careful review of the clinical and laboratory record of the case. After considering this evidence the first step in the operation is to establish the diagnosis by direct examination of the stomach and duodenum through an abdominal incision. This is not always an easy thing to do because other changes often exist at the pylorus which may be mistaken for ulcer. The most common of these is a thickening at the pyloric ring from hypertrophy of the pyloric sphincter muscle or the adjacent musculature of the pylorus. This increase in the muscle size is functional and a result of continued spasm, or it may be of congenital origin. It

may be due to causes that are adjacent or remote in the digestive tract, and is frequently present in the absence of ulcer. We have observed a very perceptible thickening at the pylorus in the presence of no other discoverable lesion than chronic appendicitis. It is fairly common with patients who suffer from gall stones, intestinal stricture, etc. To a mind that fully expects to find ulcer, a thickened muscle at the pylorus is quite liable to be satisfactory evidence that ulcer does exist in the thickened tissue although no scar is visible. This error does not happen as often as it used to but it is made now. William Mayo and John C. Munroe admonished repeatedly against accepting as ulcer any local change that did not show a definite scar visible to a bystander.

Pericholecystitis with adhesion of the gall bladder to the pylorus or duodenum, with thickening and induration of the gut, may be mistaken for ulcer. I removed the gall bladder in such a case and failing to find more than a moderate cholecystitis I excised a thickened and adherent pylorus, in one area of which I believed an ulcer existed, but the pathologist could find no ulcer in the specimen. The lesson learned was that whenever ulcer is present the signs are definite, not indefinite. Whenever one is in doubt over some indefinite tissue change, it is more judicious not to interfere. Where simple gastroenterostomy or pyloroplasty is performed for ulcer, the suspected tissue is not submitted for examination, and submitting the specimen for which the operation was done to the pathologist is the one satisfactory method of checking up the diagnosis.

In view of the tendency of the ulcer to perforate and bleed, as reported by Rodman, in the clinics of Mayo, Kocher, Von Eiselsberg, Kort, and others, gastroenterostomy is now supplemented by excision of the ulcer when it is accessible. Ulcer of the stomach is excised by the knife or cautery in every case.

The technique in the use of the cautery for this purpose has been described by Balfour. It may be used for the obliteration of peptic ulcer wherever located, but it is indicated in a group of cases where the ulcer is high on the lesser curvature. As a supplementary operation to excision, gastroenterostomy is sometimes done and sometimes not, depending upon the patency of the pylorus and the amount of deformity produced in the excision of the ulcer itself.

Whenever the ulcer is in the pyloric end of the stomach, and the condition of the patient permits, pylorotomy is the operation of choice. Unfortunately this procedure is indicated frequently in the worst cases when, for example, the ulcer is the center of an inflammatory area involving the head of the pancreas, the gastro-hepatic omentum, and occasionally the colon, gall bladder and the under surface of the liver. While these conditions do not prevail in most cases, they are frequent enough and severely tax one's judgment in determining the extent of interference which can be carried out with a fair margin of safety.

Under adverse conditions it is more prudent to do the operation in two stages. Having relieved the pyloric obstruction by gastro-enterostomy, both the general condition of the patient and the local condition will improve rapidly. Occasionally by this method there is a strong inclination on the part of the patient not to have the second stage done. After the gastroenterostomy he is promptly relieved and his condition soon becomes most satisfactory, so he may decide not to undergo the second operation.

Case No. 3961 among our records illustrates the danger incurred by deferring the second stage operation. This patient, aged 37, entered the hospital with pyloric obstruction in January, 1919. He was in bad general condition and the complete operation was not undertaken. Gastroenterostomy only was done. Relief was immediate and the progress of the patient continued satisfactorily as usual in such cases. He decided to postpone the second stage operation and left the hospital stating that he would return upon the slightest evidence of trouble. Nine months later he returned with cancer of the pylorus, extensive and inoperable. To the naked eye, at the time of the operation in January, the mass at the pylorus had the appearance of ulcer. The process was localized. No glands were observed in the environment of the pylorus. A section of the lesion was not taken for pathological examination because we expected to have an opportunity to remove the pylorus within two weeks, and I am reluctant to cut into tissue that may be cancerous because the danger of engrafting cancer cells upon the adjacent peritoneum is by no means negligible. I have found it a troublesome procedure to get a section of an

ulcer deep enough to show with certainty the true character of the tissue. Besides, failing to find cancer cells in a specimen removed from the ulcer margin or in an adjacent gland is not conclusive evidence that the central lesion is not cancer. But in this case a section would have been worth the trouble and the risk in order to obtain the only means of determining the true character of the lesion. If the patient had known that he had cancer he would have submitted to the second operation. We gave him the impression that the lesion was ulcer, bearing cancer risks, and he was willing to take chances on that possibility. This case demonstrates the fact, too, that cancer at the pylorus can develop rapidly and extensively without producing annoying symptoms if there is no mechanical obstruction to the passage of food.

J. M., aged 47, was admitted to our hospital on November 23, 1919, on account of obstruction to the passage of food from the stomach. Simple gastroenterostomy had been done five months previous with immediate good results. By the fluoroscope we observed bismuth passing out of the stoma in restricted quantity. The pylorus was apparently closed. The surgeon who had done the gastroenterostomy assured me that when he operated, the lesion at the pylorus was to all appearances ulcer. It seemed likely, therefore, that the present difficulty was due to partial closure of the stoma. Upon opening the peritoneal cavity the diagnosis was revealed by the presence of numerous hard nodes in the gastro colic omentum and multiple grafts upon the peritoneum contiguous to the incised peritoneum. Microscopic examination of a section from one of these showed glandular type of carcinoma. The interval between the two operations as stated above was five months.

The following case is of interest as a surgical problem because of the hour-glass condition produced by the ulcer on the lesser curvature, and the partial obstruction of the pylorus by muscle overgrowth. Ulcer in this area calls for one of the following operations: (1) Gastroenterostomy, (2) gastropasty, (3) gastro-gastrostomy, (4) partial gastrectomy by resection of the middle zone of the stomach, (5) excision of the ulcer supplemented by gastroenterostomy, (6) wide resection of the pylorus by the technic of Polya. I chose the last method because of the narrowing of the stomach just

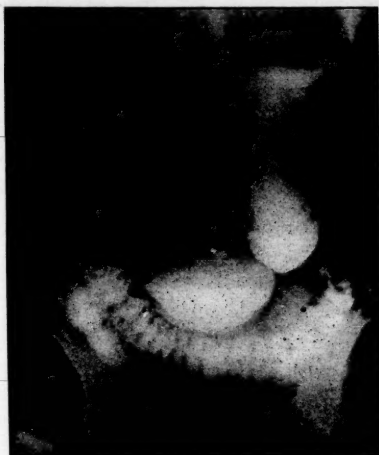


FIG. 1.—M. C. B., Feb. 26, 1915, showing hour-glass stomach with bismuth in each sac.



FIG. 3.—The distal portion of the stomach, including the ulcer area and the pylorus removed at operation.



FIG. 5.—Photomicrograph of a longitudinal section made through the pylorus, showing hypertrophy of the pyloric sphincter muscle and the adjacent musculature on the gastric side.



FIG. 2.—A residue after six hours is shown in the lower sac of the hour-glass stomach.

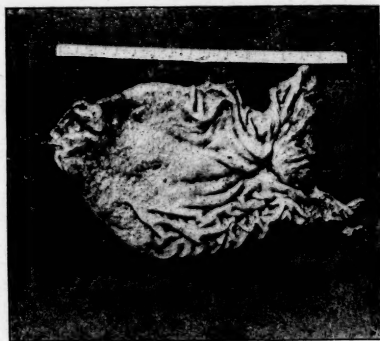


FIG. 4.—Specimen shown in Fig. 3 laid open exposing the ulcer and the pylorus.

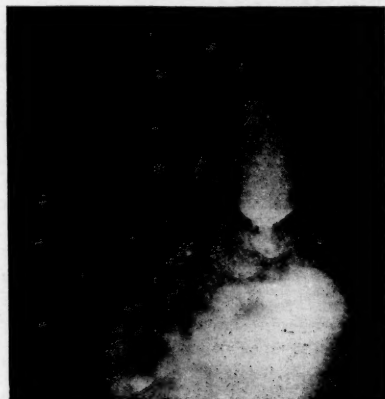


FIG. 6.—Bismuth passing out of the stomach. Plate taken six months after operation.



FIG. 7.—Bismuth passing out of the stomach. Plate taken four years after operation.

above the ulcer, making an end to side anastomosis simplified, the satisfactory results yielded almost invariably by this operation and the fact that both the ulcer and the thickened pylorus would be obtained for study. An abstract of the history is as follows:

Case No. 2218. Mrs. M. C. B., aged 53, came to the hospital on account of stomach trouble which had existed for seven years. Her mother died of tuberculosis; otherwise her family history was negative. She had typhoid at the age of 13. No other illness. Her indigestion took the form of upper gastric distress coming on from one-half to one hour after meals. She suffered from acid eructations. For the past few years, regularly about midnight, she had been obliged to take soda bicarbonate for relief. She had no relief from food but thought she was made rather worse from eating. She secured relief most successfully from the use of alkalies.

The operation revealed the condition shown by the x-ray (Figs. 1 and 2). The ulcer was located about midway on the lesser curvature. The pylorus was enlarged to a considerable degree; its peritoneum was smooth and no cicatrix could be seen. Pylorectomy was done, removing the ulcer area and the pylorus as shown in Figure 3.

The operation was done April 21, 1915. The patient is now well, being entirely free from any digestive disturbance. Six months after the operation her stomach functioned as shown in Figure 6 and four years after the operation as shown in Figure 7.

It is taken for granted that the motility of the stomach in this case was inhibited by the lesion on the lesser curvature. However, the hypertrophy of the muscle bundle at the pylorus formed a distinct tumor and without doubt was the main factor in the cause of stasis.

We have done pylorectomy for ulcer in 27 cases with but one death, which occurred from leakage of the duodenal stump. We now guard against this accident by the use of infolding linear sutures in two layers over the duodenal end; upon this is sutured a portion of the omentum.

A postoperative x-ray study of the first eight of these cases was made by Walter J. Dodd and reported in 1914. A postoperative x-ray study of the first seventeen of this series was made by Dr. J. H. Lindsey in January, 1917, in regard to which his article concluded by stating: "In general the efficient manner in which these stomachs perform their function at such long periods after operation testifies to the essential conservatism of an apparently radical operation. A further study of the remaining ten cases justifies one in stating that few, if any, operations in surgery are more permanently beneficial to the patient than pylorectomy, carried out in a selected group of cases of peptic ulcer."

Up to a few years ago the operation of pylorectomy was supplemented by a posterior gastrojejunostomy done as the first step in the operation, or occasionally in completing the operation. Later the Polya operation was adopted, which is an end to side anastomosis of the stomach with the jejunum. If amputation of the stomach was made near the pyloric ring the anastomotic opening in the jejunum to fit the cut end of the stomach would not exceed 5 or 6 cm. The stomach was converted into a funnel with the lower end passing through the meso-colon to which it was sutured. The Polya operation, then, appears to be well adapted to these cases in which section of the stomach is made near the pylorus.

Whenever the ulcer is situated high on the

lesser curvature, amputation necessarily must be made somewhere through the middle zone of the stomach. This greatly alters the technic to follow. Inasmuch as the stomach is considerably shortened and the opening of the cut end very large, the suture line making an anastomotic opening with the jejunum must be above the opening in the mesocolon instead of below it. Here stricture has resulted, Dr. William Mayo having reported two cases. To avoid this contingency, Dr. Charles Mayo has modified the operation as follows: To the cut end of the stomach he attaches the jejunum, 18 inches from the ligament of Treitz, anteriorly. When the union is completed the anastomotic opening adjoins the lesser curvature, and is no larger than 3 to 5 cm. I have carried out this technique only once but from that I can readily appreciate that this method is a step forward in practice.

There are technical difficulties, however, in making the anastomotic opening adjoin the lesser curvature, especially when the stomach is amputated in the prepyloric zone. The process of suturing may be far more difficult than it is when the opening with the jejunum is made at the lower border of the stomach because one may be obliged to work under the shelf made by the costal arch.

The number of clinicians and surgeons who believe that gastroenterostomy as a single procedure should never be the operation of choice is increasing. It is no exaggeration to state that the vast majority of internists are opposed to gastroenterostomy *per se*, yet, some who appear to be conscientious objectors to surgery in general favor radical surgery in dealing with chronic indurated peptic ulcer. For example, Dr. C. J. Johnson of Atlanta, Georgia, in 1917 made the following remarks: "Internists know that ulcers do get well without the knife and that after many years these patients have the appearance of comfort and health. On the other hand, it is true, that there is no successful treatment for some ulcers, or for the complications which they bring about, except operation."

It has been the universal experience that better results have been obtained by gastroenterostomy made in the presence of benign obstruction at the pylorus, and in this limited group of cases simple gastroenterostomy is a most useful and satisfactory therapeutic measure. But, in general, it may be said that operation

for chronic ulcer cannot be applied by rule of thumb, and it is evident that the slowly shifting technique shows the ideal operation not vested in any procedure which leaves the ulcer.

The most satisfactory method of attack aims at excision of the ulcer in a way which does not "alter the complex relations of the alimentary functions and the more complex forces which maintain these functions." One principle of far-reaching importance is the fact that the alimentary tract is a one way passage. This is constituted a law at birth. Infringement upon its claims, either from disease or from the art to cure disease, is a bid for trouble. The multiplicity of short-circuiting operations for the relief of intestinal stasis affords ample proof of this contention. When operation is to be done what surgical and physiological principles are more simple and more rational than removing the disease and leaving the alimentary tract a one way passage? It should not be necessary for nature to put up arrows on the gastrointestinal tract to impress one with the wisdom of so planning his operation as to avoid the collision of food currents. When time and the condition of the patient permit, a technic which removes the lesion and leaves food currents passing in one way out of the stomach will be far less likely to "alter the complex relations of the alimentary functions and the more complex forces which maintain these functions."

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TREATMENT OF BACK INJURIES WITH SPECIAL REFERENCE TO SPINAL FRACTURES THAT ARE NOT ASSOCIATED WITH CORD SYMPTOMS.

By HERMAN W. MARSHALL, M.D., BOSTON.

SURGICAL treatments for vertebral fractures without spinal cord symptoms were conceived and have been carried out successfully by different surgeons, so that they have to be considered now together with non-operative measures for fractures.

The data that originally suggested the feasibility of operative interference can be reviewed sufficiently from the following facts:

1. X-rays proved that vertebral fractures occur many more times than was supposed previ-

ously; and that numerous intractable so-called back sprains are in reality compression fractures of vertebrae without cord symptoms.

2. Successful transplantation of bone from one region of the body to another indicated the practicability of converting strips of bone which were taken from tibiae into reinforcing splints for the fractured sections of spines.

3. Accumulated clinical observations had demonstrated that spinal fractures, as they had been recognized, are serious injuries with prolonged or permanent impairment of back functions.

4. Patients testify unanimously that steel braces or jackets of leather and plaster are uncomfortable, restricting, and continually annoying.

Hopes were aroused, therefore, that spines might be strengthened permanently by grafting of bone along spinous vertebral processes, thus bridging over defective sections effectively enough to permit troublesome apparatus being dispensed with entirely. The medical profession owes a debt of gratitude to the surgeons who have had sufficient initiative and courage to prove these surgical methods can be of value in selected cases, and now we are in a position to inquire further into comparative merits of operative and non-operative treatments.

The following questions should be asked and answered as accurately as possible from clinical data and clinical impressions which have accumulated:

1. Are all spinal fractures without cord injury permanently crippling in serious degrees?

2. Precisely how much benefit is derived from spinal grafts? Are there any failures after surgical measures? Does surgery obviate always the subsequent use of mechanical braces?

3. What influences upon results of treatment have varying degrees of compression in the injured vertebrae and slight dislocations of fragments?

4. Can mechanical braces be improved so as to minimize their objectionable features?

Question 1. The first bit of evidence bearing on the first question, namely, whether all spinal fractures without cord injury are permanently crippling to serious degrees is offered in the following case:

A middle-aged laborer in good general health sustained an impacted fracture of a lumbar vertebra by having a bale of hay drop on him

from several stories above, while he was passing along on the sidewalk beneath. The bale hit him squarely on the shoulders and the force of the blow impacted the body of the lumbar vertebra to a degree represented by one-third of its normal thickness, that is, the injured vertebra appeared to be about two-thirds as thick as the adjoining vertebrae immediately above and below it.

There followed a serious disability lasting approximately a year or more with final complete recovery, and the patient was seen first by the writer five years after the accident for a new complaint. The old fracture was identified incidentally at this examination in x-rays which were taken then, but no complaint was made of the fracture and its existence was not known to the patient himself.

This is the only case of such decided degree of crushing with perfect functional recovery, which has been observed by the writer in a series of thirty cases, upon which this paper is based.

The second case is that of a twenty-six-year-old man of rather delicate appearance. He weighed 117 pounds, was 5 feet, 5 inches tall, and he had dropped from the top of a twelve-foot step ladder, striking on the floor in sitting posture. An x-ray taken three weeks after his injury demonstrated a barely perceptible crushing of his eleventh dorsal vertebra; and at this time he had the strength of 50 pounds in a back strength test, which consisted in lifting on a dynamometer as he stood in slightly bent posture.

He refused to stop work wholly, although obliged to give up his regular occupation of electrician. He was the sole support of his family, and, with aid of a steel back brace, with considerable discomfort, he succeeded in continuing a part of each day as travelling agent for an electrical firm. Experiments proved that a steel brace was more comfortable for him than a plaster-of-paris jacket.

He ceased entirely to draw compensation from the insurance company that was paying him at the end of six months; and two years after his injury he had discarded all of his supports. He was made a member of the firm in which he worked and at this latter date he still noticed a little back weakness occasionally when playing with his children at home.

The third case is that of a twenty-four-year-old man, 125 pounds in weight, who was a yarn boy in a cotton mill. He fell onto the top of an ascending elevator and was doubled up against overhead beams when it reached the top as he remained in sitting posture. He fractured his twelfth dorsal vertebra to a very slight degree and was advised by an orthopedic surgeon to have a spinal graft inserted, but this advice was not followed. Three months after the injury, at the writer's examination, he had surprisingly good back function and could lift 320 pounds in a back strength test. A light steel support was made for him then and subsequently he was lost sight of.

If this third patient had received an operation and good results had been obtained, there is little doubt that the latter would have been attributed largely to the surgical treatment by the surgeon in attendance.

To the writer, the injury in this instance as well as in the second case cited, appears to have been more of musculo-ligamentous character than of serious bony nature. It is true these two cases can be classed as fractures of vertebrae and might appear in surgical statistics under certain circumstances as most brilliant results, yet it seems such interpretations should be accepted with reservations when the entire situations are considered.

From these few cases it is possible to say, however, that vertebral fractures are not necessarily permanently crippling always to serious degrees; and that healthy young subjects with slight fractures seem to have fair chances of good or complete recoveries.

Question 2. Precisely how much benefit is derived from spinal grafts? Are there any failures after surgical measures? Does surgery obviate always the subsequent use of mechanical braces?

The first part of this question can never be answered positively; because it is impossible to separate results of normal reparative processes always going on in injured spines from additional results simultaneously occurring that are due to reinforcements simply from inlaid grafts.

The best idea of the value of spinal grafts in the writer's opinion is to be obtained still from theoretical consideration of the situation mechanically, especially in so far as theoretical

principles can be harmonized with dependable clinical results and interpretations.

Clinical evidence indicates that the fate of different spinal grafts is somewhat variable, and that not infrequently they are absorbed or replaced by non-bony tissue. Furthermore, from a mechanical viewpoint it is incomprehensible that strips of bone bridging spinous processes at a distance from crushed vertebral bodies will lessen pressures on these compressed cancellous front parts of the vertebrae very greatly. In subsequent forward bendings of the body crushed vertebral bodies must stand the same squeezing pressures as they did before injury; and possibly persistent pains and disability associated with fractured spines are not dissimilar in part to the pain and disability noted frequently in crushes of the os calcis.

It is well understood that a severely crushed os calcis in a patient past middle age is frequently followed by persistent localized tenderness, also pain on walking for years afterward. Accordingly, it may be well to differentiate, at least two origins of pain in spinal fractures, namely, pain due to crushing of cancellous bone in vertebral bodies and, secondly, pain due to rupture or strains of the posterior group of spinal ligaments.

It is easily conceivable from a theoretical standpoint and also is not contradicted by clinical evidence, that inlaid grafts, whether they remain as bony bridges or fibrous ones, act as reinforcements to the group of posterior spinal ligaments and muscles. It is easy to believe in severe fractures with slight dislocations of fragments and much tearing of ligaments, that closely applied bone grafts at precise sites of injuries will strengthen spines in a manner which steel braces can never do on account of the latter being more remotely situated outside the body with no intimate attachments closely around the damaged areas.

But anterior spinal ligaments, however, which have been abnormally relaxed in severe crushes will remain so regardless of posterior spinal grafts; and presumably anterior ligaments are involved in the pains associated with cancellous bony defects in anterior parts of vertebrae.

The following case is instructive in the present connection:

A middle-aged Italian laborer fractured one of his upper lumbar vertebrae, but was not operated on for several years after his injury.

Soon after the accident, while in a partially disabled state, he was sent to jail for being implicated in the killing of another Italian. After serving a two-year sentence, during which period he was able to work regularly at a sitting occupation, according to jail authorities, he was examined anew. X-rays revealed the fractured vertebrae, and an operation on his back was performed and bone grafts inserted.

He was seen one year after this operation by the writer. At the latter time he wore no support and could lift 90 pounds in a back strength test. The operation wound had healed perfectly, but he claimed that he was weaker after his surgical experience than before it. A steel back support was fitted to him after the writer's examination. The brace made him feel considerably stronger, and he was better able to continue at regular light work in a cigar store.

Presumably somewhat more damage than good was done in this particular operation, although there was perfect healing of the wound. The injured muscles and ligaments had undergone reparative changes, and the damage done to them in clearing the surgical field for insertion of grafts was greater than the benefits derived from additional reinforcement of the inlaid bone. The case serves to emphasize the importance of musculo-ligamentous stays of the spine in contrast to anatomical variations or defects purely. It also illustrates the fact that braces sometimes are needed after operations.

The writer has seen less than a dozen operative results on non-tubercular spines, and cannot give precise statistics regarding the subsequent use of back braces; but all cases after surgical treatment have to wear plaster casts or some kind of support at least for brief periods, and a considerable proportion of them are obliged to wear mechanical appliances for prolonged periods subsequently. Furthermore, some of those who do not, presumably would be benefited by braces as was the patient whose case has just been cited. These facts, however, do not discredit operations in selected instances.

An answer to Question 2 can be made fairly as follows from observations on the whole group of thirty cases. It is impossible to estimate very precisely how much benefit is derived from spinal grafts, but they usually reinforce to a slight degree at least the posterior group of spinal ligaments. They do not pre-

vent further painful pressures on crushed bodies of vertebrae. There is some danger that more damage than benefit will result from surgical operations through unavoidable cutting of posterior muscles and ligamentous attachments.

Mechanical supports are required for long periods after operations in a considerable proportion of cases, and the results of spinal grafting are not sufficiently perfect and complete to make additional benefits negligible which are secured through proper use of braces.

Question 3. What influences on results of treatment have varying degrees of compression in the injured vertebrae and slight dislocations of fragments?

This question has been answered indirectly in the two preceding ones. It is known now that all grades of bony injury occur, from tearing off of tiny particles of bone at ligamentous attachments to severe bony crushes and displacements which are accompanied by the beginning evidences of spinal cord compression and cord injury. The group of cases of spinal fractures without cord involvements therefore really is not a homogeneous one, but includes many different minor degrees of bony ligamentous defects.

The lesser injuries can be recovered from perfectly in healthy young adults in comparatively short time, with or without surgical treatment; and the more severe compressions with displacements of fragments are followed by more or less impairment of back strength permanently, whether operations are done or are not done. The most favorable cases for surgical methods, probably, are those with slight osseous damage and with extensive posterior ligamentous injury.

Question 4. Can mechanical braces be improved or used so as to minimize their objectionable features?

An affirmative answer can be made to this question; and discussions of details of construction of braces naturally merges into principles of their use, so both will be mentioned; and what is said of vertebral fractures is applicable in large measure to apparatus and principles of treatment used for the larger important group of back strains not associated with bony lesions.

An average efficient steel back brace consists essentially of two rods running up along each side of the spine from a pelvic steel base. It is

commonly held in place by various straps and bands which encircle body, arms, and legs. The steel supports help to relieve back muscles and ligaments on the one hand and, secondly, they also prevent motions which may injure the osseous framework itself.

Shoulder straps and leg straps are made frequently in ways that interfere with arm and leg movements sufficiently to be sources of serious annoyance when much activity is attempted. The writer has attempted, therefore, to minimize these inconveniences as follows: In place of usual perineal straps which are required to keep some braces from slipping up, a very thin broad flexible band of steel is made to encircle the pelvis completely and to conform accurately to its peculiarities. It is made of appropriate rigidity and elasticity to hold down attached upright bars as it grips the pelvis in a comfortable yielding way. In this manner legs are left practically free and unhampered.

At shoulders there is substituted a sternal piece of thin steel or firm inelastic fabric from which, at its upper corners, straps pass upward over shoulders to back steels and outward from its lower corners around sides of the chest under the axillae to the back brace. This arrangement is employed instead of straps closely encircling the shoulders. Pectoral muscles are left wholly unrestricted because the sternal piece covers only the sternum and because its outlines are curved to follow the curved insertions of pectoral muscles on the chest walls. Consequently there can be no irritating sawing action of straps across soft tissues at the shoulders.

Lateral and twisting spinal motions are controlled sufficiently by lateral steel uprights running up from the flexible pelvic steel band below. They terminate at the ends of an upper horizontal flexible steel band, which passes around the back of the chest from side to side and which is attached to all four upright pieces.

A very light steel cradle of considerable firmness and elasticity is thus formed for the flexible lumbar region of the spine and the body is held comfortably in it by anterior sternal straps, broad webbing straps encircling the chest and abdomen as needed and by the pelvic steel band below.

Patients prefer these simple braces to plaster-of-paris jackets or elaborate leather corsets and

they are nearly as efficient as heavier, more rigid appliances.

Other details of seemingly trivial nature which nevertheless determine comfort and effectiveness of apparatus include selection of proper widths and gauges of steel for individual peculiarities of weight and strength. Adjustable features worthy of mention are those which permit easy replacements of heavier supporting rods by lighter ones without destruction of braces as patients become stronger and more normal.

All small improvements that collectively can be described as refinements of design and manufacture contribute to ultimate success of treatments similarly as increased breadth and clarity of conceptions of the medical problems in hand likewise lead to improved results.

There can be very little benefit derived, however, from hanging a finely constructed piece of apparatus on a patient if its possibilities and limitations are not understood, or if the doctor fails to convey adequate instructions and explanations to patients about proper use of their braces.

Some supports are fitted from directions sent out by large commercial concerns which make orthopedic corsets, jackets and other apparatus. Responsibilities for successes or failures in treatment nevertheless rightfully rest with attending physicians, not with makers of apparatus; and it does not appear to be most reputable practice to prescribe appliances without knowing how much harm they can do as well as benefits they are capable of yielding.

Patients with comfortable apparatus are liable to wear the latter until weakness or atrophy of muscles from disuse appears. Or if slight temporary discomforts are experienced there will be unwarranted discarding of supports although these may be the single vital requirements for most speedy recovery of strength and normal function.

Mechanical appliances are prescribed almost wholly from anatomical viewpoints in a considerable number of cases. There seems to be wide recognition of the disadvantages of bad postures and anatomical deformities and much less appreciation that muscles and ligaments possess important physiological peculiarities themselves; that they are designed especially to cope successfully with mechanical disadvantages and marked anatomical variations. An-

atomic results of previously acting causes consequently command attention usually instead of functional causes of symptoms existing at times when treatments are received. Mechanical devices are blamed when the physicians themselves instead are at fault in not understanding the whole situation, and in not knowing precise possibilities and limitations of supports prescribed.

Physiological treatments of simple back strains and strains of ligaments and muscles associated with spinal fractures include use of braces; physical therapeutic measures; internal medical measures and general hygienic regulations that modify the quality of blood circulating through weakened back muscles and ligaments; and of exercises of varying degrees.

Successes or failures depend upon the manner with which these different physiological agents are combined and alternated. One of the commonest mistakes seems to be adherence to any single one kind of treatment. Braces are kept on continuously when instead there should be alternations with periods of graduated exercise; exercises and massage are given to muscles struggling with unfavorable vascular conditions so that under these circumstances these therapeutic measures delay returns to normal state again. Even with use of mechanical supports for low back strains there seems to be much chance for improvement. Numerous strains around lumbo-sacral and sacro-iliac regions are fitted with belts which reinforce the pelvis, yet that are very inefficient in protecting lumbo-sacral junctures from lateral and twisting movements.

There is no single brace or belt which fulfills all requirements completely of any situation very long and accordingly in the writer's opinion mechanical back appliances should be made of easily convertible character, *e.g.*, combination affairs which possess jacket features for restricting lumbar motions, with detachable belts which can be used alone to hold pelvis tightly while allowing free lumbar bending.

Then by keeping in mind certain important physiological principles, namely, the need of alternate activity and rest in all tissues, also the general scheme in most cases which starts with more or less protection for muscles and ligaments followed by gradual diminutions in use of supports and gradual increase in normal functions, it is possible to prescribe belts

or massage, jackets or manipulations or physical therapy, and internal medical regulations with increased efficiency.

CONCLUSIONS.

From study of thirty cases of vertebral fractures without cord symptoms and from a much larger series of simple back strains, the following facts and opinions have been arrived at:

Spinal bone grafts are suited best to well-to-do patients who will be considerably benefited by slight or moderate improvements in their physical conditions. Results of surgical methods are not beneficial enough uniformly; and chances of fair or excellent recoveries are so good in healthy young adults without operation, that spinal bone grafts are not warranted in the majority of workmen's cases.

Spinal grafts reinforce the posterior group of spinal ligaments and usually strengthen spines at least to slight degrees. There are some dangers that unavoidable injuries to muscles and ligaments which result from surgical procedures may weaken backs more than inlaid grafts strengthen them.

Mechanical appliances are required very commonly for considerable periods of time even after successful grafts; and results of this combination are presumably better often than either single method of treatment alone.

Slight degrees of bony fracture in healthy young subjects are fairly well recovered from without operation in six months or less at times; and severer grades of bony impactions occasionally are followed by complete restorations of back functions without operations several years after dates of injuries.

Causes of back symptoms and disability in vertebral fractures should be separated into two groups. The two causes are (1) ruptures or strains of posterior groups of spinal ligaments and muscles; (2) crushes of cancellous bodies of vertebrae with accompanying relaxations of anterior spinal ligaments. Spinal grafts presumably do not influence the symptoms greatly which originate in the second class of causes.

Mechanical braces often can be improved in details of manufacture so as to minimize their objectionable features; and while protecting injured back muscles, ligaments and bones still

permit to a maximum degree usual functions of arms and legs.

Treatments of back injuries, perhaps, should be directed primarily toward restoring strengths in muscular and ligamentous tissues because these are phases of treatment which are usually overlooked and neglected; but pathological conditions in crushed vertebrae should be appropriately treated by immobilization and protection in ways universally approved in treatment of fractures.

The influence of bad postures and of other anatomical peculiarities upon existing symptoms in simple back strains should not be forgotten. Such postural variations usually represent the accumulated results of past musculo-ligamentous changes, but do not indicate functional states of muscular or ligamentous strengths at any specified time. Backs may be comparatively strong with very faulty attitudes or relatively weak with nearly perfect postures, depending on powers of supporting muscles and ligaments at the time to accommodate for anatomic requirements.

Treatments for musculo-ligamentous defects should include use of various therapeutic agents according to physiologic requirements of the tissues in question. There should be use of mechanical braces to reinforce muscles and to offset temporarily the extra mechanical strains due to faulty postures or anatomic deformities. Physical therapeutic agents, massage, manipulations, exercises should be employed as well as internal medical measures. The latter rectify vascular defects and influence muscles and ligaments through the qualities of circulating blood.

Continuous exclusive use of any one of these methods is unjustifiable for very long periods, and they should be alternated and combined with due regard to established physiological principles of alternate rest and activity known to be best for muscles and ligaments.

It is unjustifiable to prescribe mechanical apparatus without knowing accurately harmful as well as beneficial possibilities; and without explaining to patients adequately the functional goals which should be sought and those to be avoided among continually fluctuating states in muscles and ligaments. Use of mechanical apparatus ought to be conceded more generally to be a complicated important matter, which

should not be lightly undertaken, bungled, and finally abandoned with unjust condemnation of these valuable therapeutic agents.

SOME INCIDENTS IN THE LIFE AND MILITARY CAMPAIGNS OF BARON LARREY (1766-1842).

BY WILLIAM PEARCE COUES, M.D., BOSTON.

At the present time a study of the life and accomplishments of the greatest of military surgeons has a peculiar interest. Though the name of Larrey is well known in America, and occasional articles concerning him have appeared in the journals of this country, it is hoped that some new facts of interest will be found in the following pages. Certainly the accomplishments of this great man, with the almost insurmountable obstacles he had to contend with, form a page of medical history which can well be compared with all the wonders of military surgery in the recent war.

A hundred years ago the constant battling with widespread and overwhelming infections which swept through armies like a conflagration, formed a very great part of the military surgeon's work. Larrey coped with many of these successfully, and proved himself a military hygienist of the highest order. This, combined with his great surgical genius, formed a combination of qualities which has never been excelled.

To many men who have arrived at such great distinction in their different callings there is denied the love and devotion of their fellow-beings, through certain defects of character which may be ascribed to the eccentricities of genius. Larrey, besides his great skill and untiring devotion to his work, was happy in possessing the esteem and even the adoration of his patients to a degree seldom equalled. To be sick or wounded, whether friend or foe, was the only qualification necessary to procure his attention and devotion. Indeed, at one period of his campaigns he almost lost his life, while attending English soldiers, ill of typhus. That this was not the only time that his life was in jeopardy will be seen as we follow his career through some of the thrilling incidents through which he passed. Unquestionably his great strength and rugged health enabled him

to withstand much that would have killed or permanently disabled many another.

Through the scorching heat of the Libyan desert, with little food or water (most of which he gave to his wounded), on he went, operating, dressing the wounded, caring for the sick, and noting all for the great medical history of his campaigns. The scene changes: it is the retreat from Moscow; all through the disastrous march in the bitter cold Larrey was omnipresent, overseeing, warning the soldiers of sudden approach to the bivouac fires, which was certain death, procuring sustenance, cheering the wounded, and comforting the dying. The graphic depiction of these experiences, told with a modesty and charm difficult of description, must be read at first hand in his "Mémoires et Campagnes Militaires" to be fully appreciated.

We will now turn to a more detailed account of the life of Larrey, touching at the same time on some of his experiences and triumphs of military surgery.

Jean Dominique Larrey was born at Beaudean, in July, 1766. Beaudean was a small town of only about 600 inhabitants in the department of the "Hautes Pyrénées." Larrey's parents were poor, and they were unable to send their son away to school, so they were dependent on the Abbé de Grasset, the village priest, for his early education.

Larrey's father died when he was still of tender years. At the age of thirteen, we find him leaving home for Toulouse, where he had determined to study medicine. At Toulouse lived an uncle, Alexis Larrey, who was a provincial surgeon of some note, attached to the chief hospital of this city. The younger Larrey pursued his studies at the School of Medicine and Surgery of Toulouse, and was, after a time, given residence in the hospital, where he worked under the direction of his uncle Alexis. Here his work was most creditably performed, and he laid a solid foundation of medical knowledge, which was always to stand him in good stead.

At twenty-one years of age, he left Toulouse and journeyed to Paris, the Mecca of all young provincial surgeons. He arrived in August, 1787, and a few days afterwards he tells us that the celebrated Louis announced a "Concours" for the position of auxiliary surgeon of the marine, Department of Brest. Larrey

was successful in his examination, and obtained one of the positions, thus enabling him to satisfy his longing for adventure, and a sea voyage. On his way to Brest, he travelled on foot and passed through Laval, the birth-place of Ambroise Paré.

He was soon attached to a frigate, *La Vigilante*, which sailed from Brest for Newfoundland in July, 1787. This expedition was for the purpose of inspecting the French fisheries in these waters, and did not return to France for two years.

Some of the incidents of the voyage and Larrey's observations on the countries visited, with interesting notes on the different animals of Newfoundland, are recorded in the first part of his "Campaigns."

Soon after his return he was called to the Army as surgeon of the first class under General Luckner. In 1794 we find him Surgeon in Chief of the Army of Invasion of Corsica, the 14th Army of the Republic. It was at this time that the friendship between Napoleon and Larrey began, Napoleon commanding the artillery of the same army. This friendship and devotion on the part of Larrey to Napoleon forms one of the most interesting parts of the former's life; and he was the means, as we shall see later, of saving Napoleon from the consequences of what might have been a most regrettable incident in one of his campaigns (Saxony).

Larrey was with the Second Army of Invasion of Corsica, and after this campaign he was ordered to Toulon, where he founded an Anatomical and Surgical School for the instruction of naval surgeons. From Toulon he was called to the Military School of Val-de-Grâce, under the presidency of Coste. Here Larrey had charge of the departments of Anatomy and Operative Surgery, where the greatest care and pains were taken in the instruction of young military surgeons. Larrey tells us that if an operation was undertaken, it was always in the presence of other instructors and students, so that all could profit by the teachings of each case. The operative procedure was outlined, the reasons for operating given, and the after-results predicted. Exact notes were taken at these conferences, with minute observations of each rare disease encountered. Certain anatomic and physiologic experiments on animals were made in conjunction with the

cases calling for them, and many autopsies were performed, the results being noted with scrupulous care. Larrey's activities at Val-de-Grâce were during 1796-1797.

In 1798 he accompanied the army to Egypt, where many of his most interesting observations were made. His description of the plague, and its ravages among the native populace and the army is especially vivid. At Jaffa he made many post-mortems on plague subjects, and attended others, almost miraculously escaping the disease itself. In two months' time he lost fourteen surgeons, eleven apothecaries, three physicians, and many nurses of the plague. Among them were some of his best and most cherished assistants.

Larrey estimated that in 1801, fully 150,000 Egyptians died of the disease. Napoleon organized his famous Commission at this time, composed of generals, surgeons, and "Officiers de Santé," which brought into being and kept up the strongest measures for the abatement and stamping out of the scourge.

Mascalet, a surgeon attached to the army under Larrey, giving his example to others, shut himself up in the plague hospitals, and saved a large number of these unfortunates, who would otherwise have died. At last he himself became infected, and died, a martyr to the cause. Even Niel, Larrey tells us, his "élève cheri," who had become infected with plague while assisting him at an autopsy and had recovered, became infected again and lost his life.

Larrey gives this touching tribute to the devoted Mascalet: "At last we had the misfortune to lose in him one of the most devoted friends of humanity, a most zealous colleague, and perhaps the most talented of all. Worthy sharer of my work, receive here with your pupils the tribute of my eternal regrets, and the sincere assurance that your name and memory will live forever in my heart!" It might well be said that these two physicians, Niel and Mascalet, were the Walter Reed and Lazear of their times. Besides the scourge of plague, Larrey had to contend, during his Egyptian campaign, with yellow fever, leprosy, smallpox, syphilis, and ophthalmia. His descriptions of these various diseases as affecting the troops form some of the most interesting parts of his "Mémoires." It is of interest in passing that Larrey regarded leprosy, certainly in some cases, as due to a diet of dried salt fish, as

did Sir Jonathan Hutchinson, many years later.

Turning now to the surgical aspects of the Egyptian campaign, we will quote a single case, which certainly parallels in a most striking way the present reports of war wounds of the face and head. That the result achieved by Larrey was a remarkable one for any time, none could refuse to say.

Louis Vouté, corporal in the 88th light infantry brigade at the siege of Alexandria in 1801, received a bullet full in the face (probably a mutilating one, such as the Mamelukes used). The lower jaw was almost entirely carried away, as well as three-quarters of the upper jaw; there was left "une plaie épouvantable." The soft parts were almost completely destroyed as far back as the second molar, and also up to the temporal articulation of the jaw. The nasal bones, as well as the ethmoid, were crushed, and the bony portions of the nasal fossae completely gone, and the zygoma and the right eye injured beyond repair. To add to the unfortunate's condition, the tongue was cut half-way across, and the posterior nares and pharynx were widely open. The jugular vessels were exposed in the neck, by extensive laceration of muscular tissues. Larrey states that he found this unfortunate in one of the hospitals of Alexandria, where his companions had left him, thinking he was dead. The pulse was hardly perceptible, the body cold, and the patient evidently in a state of profound shock. There had been no nourishment given for two days.

Larrey succeeded in getting the poor fellow to take some bouillon through an esophageal tube (he could not speak a word), and after he had somewhat regained his strength, an operation was done. The bruised and lacerated soft parts were excised, after foreign bodies had been removed, and the great wound was scrupulously cleaned. Some vessels were ligated, and the parts allowed to fall in position as much as possible, being maintained in apposition by various points of suture. Nourishment was by the esophageal tube. The wound did well, the patient's strength slowly returned, and gradually the great wound closed, so that it seemed impossible that there had been such loss of tissue. At length the soldier was invalided to France, swallowing and talking fairly well. For years he was to be seen at

the Invalides, his facial defect being covered by a silver mask.

Napoleon was deeply grateful for all the care and solicitude of Larrey for the army in Egypt, and deeded to him 200,000 francs. After the battle of Aboukir he received a sword from Napoleon, for having operated on General Fougères, "sur le champ de bataille," and saving his life. On the sword were engraved the words, "Aboukir et Larrey."

In 1802 Larrey returned to France, and shortly after this received the Cross of the Legion of Honor from the Emperor.

In 1805 he was made Inspector General of the Medical Service of all the Armies, and Surgeon-in-Chief of the Imperial Guard. He was with the Guard in almost all the campaigns of Germany, Prussia, and Spain. In all, Larrey took part in twenty-one single and five double campaigns in his long service of fifty-three years with the Army.

During the campaign in Poland in 1806, Larrey made an exhaustive study of the "Plica Polonica," which was presented formally on his return to France. He showed that this trouble, which had existed for years in Poland and was thought to be a symptom and crisis of a general disease called "trichoma," was not an entity, but depended principally on the lack of care of the scalp and hair of the Polish Jews, and yielded quickly to cleanliness and hygiene.

Early in his military career, Larrey made a deep study of the transportation of the wounded, and of remedies for the great delays which had heretofore existed in connection with their prompt transportation from the front lines. He devised his famous "Ambulances Volantes" to meet this difficulty, and they immediately achieved the greatest success. These were strong, though lightly built, ambulances, of two types, for one or two horses, which could travel over very rough country, and accompany the regiments practically to the firing line in many cases. Many times Larrey brought back wounded from the front lines himself at great risk. The grenadiers were full of praise for his new method of transportation, and soon General Beauharnais recommended him highly for this advance in the immediate care of the wounded.

Perhaps the most dramatic of all campaigns through which Larrey passed was that of Rus-

sia. The burning of Moscow, the retreat, and passage of the Berezina are among the most thrilling incidents of this campaign. It would be difficult, he says, to imagine a more horrible picture than the burning of Moscow on the 18th and 19th of September, 1812. Dry and fine weather aggravated the conflagration. During this night, of which the tragic incidents will always remain in my memory, the whole city was enveloped. Flames of different colors shot to the heavens covering all points of the horizon, giving off extraordinary light and heat. The sudden explosion of magazines and oil reservoirs added to the horror of the picture, which struck terror to all hearts, citizens and soldiers alike. The soldiers were evacuated to Petrosski, on the route to Petersburg, but I remained with some comrades in a stone house, somewhat isolated, near the Kremlin. The citizens who were left in the city were caught in the conflagration, and rushed wildly about from house to house, giving vent to indescribable cries of horror. Women carried children on their shoulders, taking others by the hand, running to escape death which threatened them from all directions. I saw old men, their long beards aflame, seated on little carts drawn by their relatives, endeavoring to rescue them from this inferno. In eight or ten days this great and superb city was reduced to ashes, with the exception of the Kremlin and a few stone churches."

The stores that Napoleon had counted on finding in Moscow were practically all burned, and the army faced a retreat without definite means of procuring more. The cold grew intense and gradually ambulances, artillery wagons, and accoutrements were all sacrificed in the bivouac fires.

Larrey tells us that the soldier who, exhausted by the cold, came too quickly to the bivouac fire, was almost instantly attacked with gangrene of the extremities, or toppled over dead into the fire. To stumble or fall in the line of march was almost certain death, and the soldiers plodded on, with eyes fixed on the ground: some one in the ranks would stagger and fall; to come to his relief was impossible for his weakened and almost frozen companions. Larrey owed his life and his freedom from gangrene to his walking, and not attempting to ride. For the sick he made a broth of horse meat, flavored with gun powder, for the

soldiers largely subsisted on the flesh of horses they found frozen by the wayside, or killed from necessity. Larrey graphically expressed the extremity to which the army was reduced as follows: "Quiconque se couche, s'endort, quiconque s'endort ne se relève pas."

Ravarit gives a most interesting account of the crossing of the Berezina. He tells us that at the time that several regiments of the line, among them the 82nd, celebrated the glorious centenary of the battles of Lutzen and Bautzen, and when Germany is rapidly multiplying her armaments (1913), it is fitting to remember that it is just one hundred years since the newly formed French armies triumphed over those of Russia and Prussia which were numerically three times as strong. We should also remember, he says, as pointed out by Drs. Triaire and Bonnette, the greatness and nobility of character of an army surgeon during that glorious but sterile campaign of Saxony.

The 27th of November, 1812, Baron Larrey, First Surgeon of the Guard, figured in the tragic episode of the passage of the Berezina, when he barely escaped with his life. His popularity with the soldiers and the profound affection which he inspired in them, were undoubtedly the means of saving it.

"Do not worry, Monsieur Le Baron," said one of the grenadiers, the evening of the disastrous passage. "Fear nothing, we are with you, and the Emperor is with us; he will get us out of this."

During the noise of the desperate battle which the Duke de Bellune waged with a few battered and half-frozen regiments against the 120,000 Russians under Wittgenstein, a single man was recognized, cheered, supported from hand to hand to the other side of the stream, which numbers of generals were unable to reach, at the moment when the bridge disappeared in the icy waters of the Berezina. This man was Larrey.

Shortly after the battle of Bautzen, Ravarit tells us, reports were brought to Napoleon that many of the conscripts were wounded in the hands, and there was grave suspicion that these injuries were self-inflicted. Forgetting the unquestionable heroism of these new troops under fire, and dominated by first impulses, as often was the case, Napoleon came to the definite conclusion that the wounds were not in-

flicted by the enemy, and ordered that one in twenty of the conscripts should be shot.

Not a voice was raised against this drastic and unjust action, and, indeed, certain officers tried their best to excite Napoleon further regarding the matter. To Larrey alone belongs the great honor of having saved Napoleon from this act of injustice. Larrey wished to undertake an immediate and searching medical investigation of the charges against the conscripts, but met with continued obstacles, and only his persistence led to Napoleon's granting him an interview to discuss the subject. The interview took place at the Marcolini palace, and after a time Napoleon agreed to the project, saying, "Go, Monsieur Larrey, and do your duty." Larrey promptly undertook the investigation, in the midst of his other pressing duties.

He examined with scrupulous care 2,672 soldiers accused of self-mutilation, and in a report which Ravarit says was worthy of the greatest expert in legal medicine of the present day, he proved that the wounds of these men were not intentionally inflicted, and that almost all were using muskets for the first time, and this fact was responsible for their wounds. Only the young recruits had these wounds, and at the same time they had sabre wounds, proved to have been received at the time of the furious onslaught of the Prussian and Russian cavalry.

After his investigation, Larrey was again admitted to the presence of the Emperor, who said, "Well, Monsieur Larrey, do you still persist in your opinion?" "I do more, Sire," said Larrey, "I bring you proof that these brave young troops have been outrageously calumniated. There is not a wound but has been scrupulously examined." As a soldier who had participated in all the exigencies of the battle of Lutzen, and as a physician Larrey warmly pleaded the cause of the heroic conscripts.

Rapidly and impatiently the Emperor read the report. In a few minutes his expression became calm and benevolent, and rising, he warmly wrung the hands of his Surgeon of the Guard. "Go, Monsieur Larrey," he said. "A sovereign should be happy to have in his service a man like you. My orders will be sent you."

In a few hours' time, Larrey received the portrait of the victor of Austerlitz, encircled

in diamonds, and a pension on the State, another favor added to that glorious one granted the night of Wagram, when the Emperor had made him a Baron and a Commander of the Legion of Honor.

Of the many articles by Larrey on surgical subjects, none is more interesting than his "Notice sur l'Aneurisme," incorporated in his volume of "Campaigns" (Austerlitz, Vol. II, p. 348). That his ideas on the etiology of internal aneurysms were far in advance of his contemporaries is clear.

After the campaign of Austerlitz, Larrey returned to Paris and began work on classification of his notes and records of those patients afflicted with aneurysm. After mentioning the work of Scarpa and Morgagni and others on this subject, he tells us that his own theories as to the etiology of aneurysms are at variance with the generally accepted view, and that he could not accept the traumatic etiology of these internal aneurysms. He argued that when men were sober and led good lives, they were not afflicted with aneurysm, no matter how violent their efforts.

He tells us that if it were possible to go back and trace the primary cause of these blood-vessel dilatations, we would be convinced that this cause is due to a particular virus which localizes in different parts of the living tissues according to the affinity for it. The virus of syphilis, which circulates through the tissues of the body, and which is kept nourished in its course, nevertheless may give no outward manifestations of its presence, but encountering a tissue to its liking, remains fixed there. Symptoms of venereal disease preceded internal aneurysms in the patients that he observed dying of this trouble, and these observations, he says, strengthened his theory as to the cause of aneurysm. He urged that antispecific remedies must be used early in these conditions, as this may prevent aneurysms from occurring.

If we substitute *spirochaeta pallida* for Larrey's "syphilitic virus," the above statements would make an excellent modern dissertation on "New Facts Concerning Syphilis of the Internal Organs."

Among the very interesting and sound principles of surgery for the times was Larrey's dictum that in some crushing gunshot injuries of the extremities, immediate amputation gave the only hope. He performed these operations

with astonishing celerity,—three minutes being the actual time taken for most amputations. His method of procedure in amputations at the shoulder- and hip-joints are known to all present-day surgeons. Most striking was the immediate improvement of these unfortunate wounded after the amputation. The pain, shock, and restlessness were relieved as if by magic, and often the soldiers sank down in the snow and slept peacefully, as soon as their dressing was completed.

In the campaign of 1809, at Lobau on the Danube, Larrey was called to the Duke de Montebello (Marshal Lannes), who had a grave gunshot wound of the knee that required amputation. Lannes was one of the warmest friends that Larrey had, having been all through Egypt with him, and he states that never had he been in a harder and more trying position. Unfortunately, Larrey's fears for the outcome of the case were realized, and the Duke succumbed some days later, undoubtedly of sepsis.

Great stress was laid by Larrey on evacuating the wounded from the crowded hospitals as soon as possible. Many were saved in this way from the hospitals at Eylau in the campaign in Poland. Some of them were so weak they could not move or lift a finger. Larrey put many of them, himself, into ambulances. Some surgeons regarded this evacuation as an act of barbarism, as it seemed as if many of the sick could not live twenty-four hours; but Larrey tells us he quoted the saying of the Prince of Medicine, "Ad morbos extremos, extrema remedia." Infinite care was taken in the transportation and skillful help in plenty was at hand to accompany the ambulances, which were preceded by couriers, to make preparations for them. To the surprise of many, the wounded arrived at their destinations afebrile; their wounds in much better condition; a very few only having succumbed. This Larrey attributes to the fresh air, change, and freedom from the hospital atmosphere, loaded with infection.

Some interesting statistics of the wounded are given by Larrey. Of 22,000 wounded in different battles of various army corps, 14,084 in the hospitals between the Oder and the Rhine were examined by the Sanitary Commission; 6,703 of these, cured of their wounds, entered their respective corps for active ser-

vice; 4,027 somewhat incapacitated were employed on the artillery trains, or in the ambulance divisions; 3,354 absolutely unfit for any work were evacuated to France, with the exception of a few whose wounds were not advanced in healing enough to permit of this. Of these, 3,354 completely incapacitated, 731 suffered the amputation of one or more limbs.

Of the 7,916 left to consider (from the 22,000), more than 3,000 were completely cured of their wounds and back in their regiments, 2,500 were relatively incapacitated and passed to the Rhine towns or to France.

About 2,400 in all died of wounds, among them 972 who had suffered various amputations. Surely these statistics form a wonderful record for the times, and speak volumes for the work of Larrey and his staff.

On the return of Napoleon from Elba in 1815, Larrey was one of the first to welcome him. On presenting the flag of the Department of the "Hautes-Pyrénées" at the presentation of flags of Departments, Napoleon is said to have spoken thus: "Gentlemen, it affords me unfeigned pleasure to present to you this Color, through your compatriot, Larrey, who honors humanity by his disinterestedness and courage. We are indebted to him for saving a large number of our soldiers, in the deserts bordering on Libya, by giving them fully of the little pure water and spirits which had been preserved for his own use, and of which he himself stood in the greatest need."

Larrey was never far from Napoleon from this time until the separation at Waterloo. Here he was always at his post, operating on the battlefield through storms of rain. During the retreat he and his staff were taken prisoners by a corps of Prussian Lancers, Larrey's horse being wounded at the same time that he was wounded in the head. He was left on the field for dead, but recovered consciousness after a time, remounted his wounded horse, and resumed the retreat, when he was again surrounded by Prussians. Notwithstanding his prompt surrender, he was disarmed and stripped of nearly all his clothes, the Prussian officers dividing the contents of his purse, and taking possession of his arms, ring and watch. The grey army coat he wore and a certain resemblance in figure led the Prussian officers to mistake him for Napoleon, and he was sentenced to be shot, when providentially he was

recognized by the Surgeon General of the regiment, who took Larrey before Bülow, who recognized him, and ordered him taken before Blücher. By a strange coincidence, Larrey had saved the life of Blücher's son in one of the Austrian battles. Blücher ordered his release from confinement, and Larrey was sent to Louvain, where he was at first wretchedly housed, but again being recognized by a young medical officer who had been sent to dress his wounds, he was removed to the house of Monsieur Yonk, an influential citizen of the town.

After his wounds were healed, Larrey returned to Paris, where he found the new order of things in full swing, and he was coldly received. Almost all his pensions and positions were taken from him, and his wife was obliged to give painting lessons to help along the ménage. The only office which he was permitted to retain was that of surgeon to the Hôpital de la Garde.

From 1815 to 1818 he was in very straitened circumstances, if not in actual want. Larrey, however, kept up his indomitable courage, and gradually the skies began to clear, and some of his appointments and emoluments were returned to him. He thought at one time of seeking new fortune in America, and also was offered the full charge of the Medical Staff of the Brazilian Army. He was engaged in writing all his numerous and wonderful experiences in his different campaigns at this time, especially the campaigns of Russia, Saxony, and France.

In 1834, Larrey set out on a tour of the south of France, which was extended to Italy. He was able to visit Beaudean again, his native place, and what was his wonder and joy to find his old friend and tutor, the Abbé de Grassat, still alive, though more than ninety years of age!

Through almost every village which he passed, he met old companions in arms, the remnants of the "Old Guard," so many of whom he had treated, and many of whose lives he had saved. When these veterans, many of them cripples, heard that he was coming, they travelled miles to see him, and followed his carriage on foot for some time.

In 1842, Larrey made a trip to Africa, as Official Inspector of the Hospitals of Algeria, where he saw many of the old battlefields he knew so well. He was accompanied in this mission by his son, Hippolyte Larrey.

On his return he was stricken with pneumonia at Lyons, and died in that city on July 25, 1842. By a singular coincidence, Madame Larrey died in Paris on the same day. He was buried in the cemetery of Père la Chaise, where so many illustrious French medical men were laid at rest.

Thus ended the life of the greatest of military surgeons. For fifty-three years he had given the best of his life to France and her army, in a long record of achievement that has never been surpassed, and has added its share to the glory of that incomparable country.

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THE TECHNIQUE OF CITRATED BLOOD TRANSFUSION.

By HENRY C. MARBLE, M.D., BOSTON, MAJOR, MEDICAL CORPS, U. S. A.,

Assistant Surgeon to Out-Patient Department, Massachusetts General Hospital.

THE transfusion of citrated blood now seems to have taken a very definite place in the surgical world. Its advantages over other methods are numerous, its therapeutic results are identical and when carried out with careful, painstaking technique it is safe, accurate, and sure. Thousands of these transfusions were carried out in the A. E. F. with remarkably good results.

In performing citrated blood transfusions several points must be carried in mind.

- a. The recipient must be carefully typed.
- b. The donor must be carefully typed and if time permits a Wassermann reaction done.
- c. Only donors of the same or higher types than the recipient shall be used.
- d. Blood is a fragile tissue, the processes of coagulation begin almost instantly when the blood leaves the vein, therefore the blood must pass quickly, easily and cleanly into the sodium citrate solution and be immediately mixed with it before coagulation begins.
- e. Having obtained the blood and having carefully mixed it with sodium citrate, the process of administering it to the recipient may be carried out much more leisurely than in

other methods, the problem of coagulation having been eliminated.

Altho citrated blood will keep for two days, it is always well to complete the transfer as quickly as possible and in my transfusions never have more than thirty minutes elapsed between the time of taking of the blood and its introduction into the vein of the recipient.

The steps here enumerated are those followed by the author in Base Hospital No. 6 (Massachusetts General Hospital) in France.

TYPING (MACROSCOPIC METHOD).

On a clean glass slide place three drops each of Type No. II and Type No. III serum. This serum is human blood serum from known types, the serum having been separated from the blood and citrated.

Prick the ear lobe of the recipient and from it take a drop of blood on the point of a clean knife and mix with No. II serum on the glass slide.

Carefully wash the knife and take a second drop and mix with No. III serum on the glass slide. Gently rotate the slide forward and backward in order that the blood and serum may be thoroughly mixed. Soon, five to ten minutes, changes will begin to take place in the appearance of the little pools. The blood may agglutinate in one or in the other and form in small clumps, having somewhat the appearance of the top of a saltcellar.

If agglutination occurs in both No. II and No. III serum then the recipient is necessarily Type No. I.

If agglutination occurs in No. III but not in No. II, the recipient is Type No. II.

If agglutination occurs in No. II but not in No. III, the recipient is Type No. III.

If there is no agglutination, the recipient is Type No. IV.

Having determined the type number of the recipient the process is repeated on the prospective donors and their type numbers found. A safe rule to follow is that a recipient may receive blood from his own type or from any type higher.

A Type No. I may receive blood from Types I, II, III, and IV.

A Type No. II may receive blood from Types II, III, and IV.

A Type No. III may receive blood from Types III and IV.

A Type No. IV may receive blood from only Type IV.

Type No. IV is a universal donor. Type No. I is a universal recipient.

If known type sera—II and III are not available, the following method may be used:

Draw the blood from the recipient as for a Wassermann reaction. Allow to clot and the serum to separate. Pipette off the serum and centrifuge until clear. Add normal sodium citrate solution (3.8%) in the proportion of one part to ten parts serum.

Use this as a type serum. Mix it with blood from donors as before, rejecting those that agglutinate.

In army hospitals it proved convenient as well as expedient that certain healthy soldiers be typed and Wassermann reactions done, so that when a donor was required, a candidate of the type desired was immediately available.

DRAWING OF BLOOD.

Apparatus.

A large graduated flask similar to a Vincent tube but of a capacity of 1,000 c.cm.

A short rubber tube or catheter about two inches in length.

A sharp, clean, large needle, 14 to 16 gauge.

A long glass stirring rod.

The needle must be kept absolutely clean, razor sharp, and the rubber connecting tube clean and smooth.

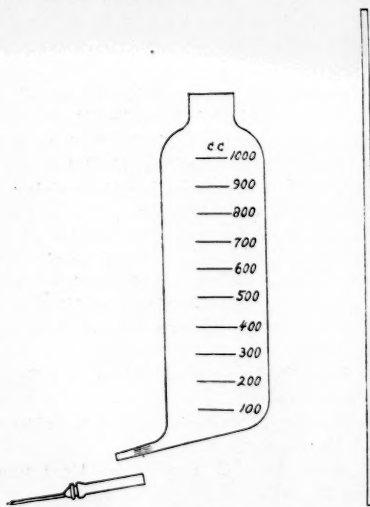


PLATE I.

Procedure.

Place the donor's arm extended on the table. Scrub the area over the median basilic vein with soap and water followed by alcohol. Apply a light rubber tourniquet to the upper arm, sufficiently tight to dilate the veins. (Take the pulse at the wrist to be sure that the tourniquet is not too tight.) Select a large vein and inject a few drops of novocaine over the site of puncture. A small $\frac{1}{4}$ -inch transverse incision may be made in the skin over the vein to facilitate entrance.

Assemble the apparatus and pour into the flask 50 c. cm. of freshly made sterile isotonic sodium citrate solution (3.8%).

Pinch the rubber connecting tube to prevent the escape of the solution. Allow a few drops to run out of the needle to moisten it.

Point the needle toward the hand and introduce it under the skin and into the vein. While the blood flows into the flask, hold the needle immobile in the vein with one hand and with the other hand, hold the flask upright. The assistant gently stirs the citrate solution into the blood with the long glass stirring rod. If this is not done the citrate solution will float up on top of the blood and not mix properly. Instruct the donor to open and shut the fist. The column of blood will rise rapidly in the flask until the desired amount is drawn, four to six minutes being the ordinary time required.

The flask is so constructed that in the event that the donor possesses small veins or is exceedingly fat or if the surgeon is not certain in vein puncture, the vein may be exposed under novocaine for a distance of about an inch, ligated above, a small opening made in the vein and the tip of the flask introduced without needle or rubber connection. In this case the tip is first washed out with a little citrate solution and the remainder of the citrate solution is poured in as the first drop enters the flask.

With 50 c. cm. of citrate solution and with careful mixing, as much as 500 c. cm. of blood may be drawn. (That is 550 c. cm. of total solution.)

If more blood is required add relatively greater amount of sodium citrate solution.

The desired amount of blood having been drawn, pinch the rubber connecting tube, remove the tourniquet and withdraw the needle.

Close the flask with a rubber stopper, and hold it in a horizontal position.

Disconnect the needle and rubber tube and have them washed immediately in cold water.

Take the flask of blood to the recipient and reverse the process.

INTRODUCTION OF BLOOD.

Apparatus.

The same flask filled with blood and stoppered with rubber stopper. Connecting tube three feet long with glass window near distal end and metal needle connection on the end. Needle much smaller than in other apparatus or small cannula. (19 or 20 gauge.)

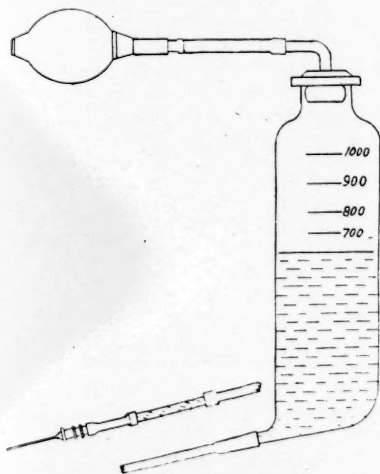


PLATE II.

Procedure.

Apply a light tourniquet to the upper arm. Prepare the arm and expose the vein under novocaine as before.

Assemble the apparatus. Fill the connecting tube with blood by tipping the flask. Introduce the needle or cannula into the vein directing the flow upward. Remove the tourniquet. Elevate the flask, release the flow and allow the blood to pass into the vein by gravity. The process being identical with the introduction of salt solution or salvasan. The rate of flow should not be faster than 50 c. cm. per minute.

If the rate is too slow it may be hastened by applying air pressure above with a cautery bulb.

After the blood has been injected, withdraw the needle or cannula and the transfusion is ended.

It is a good practice to stop the flow for a minute after the first 30 c. cm. have been injected to note possible symptoms of hemolysis. These symptoms may be summarized as follows: (a) Shortness of breath; (b) intense flushing of the face, sometimes with urticaria; (c) pain in abdomen or back; (d) vomiting. In my clinic in France no hemolytic reactions were encountered. Slight chills occurred in a small percentage of the cases in from 15 minutes to three hours after the transfer was completed but they were of no serious import.

Batteli and Stein have shown that 60 to 70 per cent. of the sodium citrate disappears from the body in 20 seconds and that 10 to 20 per cent. of the remainder disappears during the next five to ten minutes.

ADVANTAGES OF THE CITRATE METHOD.

a. The whole apparatus may be sterilized by boiling and may be used repeatedly. I have performed four transfers of blood in one afternoon with a single apparatus. Following each transfer the apparatus was washed in cold water and reboiled. No further preparation is required.

b. In drawing the blood if there is clotting in the needle a new one may be substituted without losing or harming the blood already drawn.

c. Citrated blood will keep several hours if necessary.

d. The blood may be drawn in the operating room, carried to the ward in the flask and there introduced into the patient.

e. The therapeutic results as compared with other methods of transfusion are identical.

f. The whole operation may be done easily, surely, and without haste.

g. The blood may be administered through a very small needle without incision, which is of value in hemorrhagic patients who often bleed from the wound.

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SILENT GASTRIC CANCER WITH GENERAL ANASARCA.

IN *La Presse Médicale* for June, 1919, there was published an interesting article on an unusual subject by Gouget, the exact title being, "L'évolution du Cancer de l'Estomac à Forme d'Anasarque."

Gouget says that though Chesnel first brought out the fact of latent stomach cancer with generalized anasarca, comparatively little has been written on the subject, and many of the cases remain undiagnosed until in the last stages of the disease, or on the autopsy table. The patients at first give the impression of those afflicted with a chronic nephritis or a chronic cardiac insufficiency. A careful examination rules out these conditions and the dropsy remains to be accounted for. The cases are sometimes confused with pernicious anemia, but again the blood picture rules this condition out. The anasarca in these cases is so generalized

that the group of cases stands alone, and cannot be confused with those cases of gastric cancer having oedema of different parts from the pressure of secondary cancerous masses.

Gouget has found 12 cases reported in the literature which fulfill the requirements as to symptoms, and adds one of his own. The cases are very apt to be treated for cardiac incompetency, as the possibility of nephritis can more definitely be ruled out, with special tests and examinations.

The cases group themselves roughly into three different classes. The first comprise those hospital patients who enter the wards in an extremely feeble condition with generalized oedema, but no gastric symptoms whatever, and without albuminuria. Death occurs in a short time, and at autopsy extensive gastric cancer is found. The second group comprises those cases with rapid and definitely known time of the development of generalized anasarca and without symptoms on the part of the stomach till nearly the end of the illness. The dropsy may occur quite suddenly, the patient being in previously good health and in less than three months the patient succumbs to gastric cancer. The third class of cases comprises those with a definite long stage of oedema, sometimes up to a year in duration, with marked fluctuations in the amount of the swelling, and sometimes its disappearance for a time, only to return and be persistent. In these cases as in the others the heart and kidneys are not definitely diseased.

Gouget's personal case was that of a woman of 52 years who had always enjoyed good health until a year before, when she began to notice swelling of the legs. After a time the oedema improved, but returned. There were absolutely no gastric symptoms present, and the urine was negative. At first the case was treated as one of cardiac dropsy, and digitalis and diuretics were used with improvement of the condition so that the patient was able to leave the hospital and resume her work. The symptoms returned, however, with ascites, and the patient returned to the hospital for treatment. At this time treatment as for cardiac insufficiency had no effect whatever. Gouget tells us that the anemia was not pronounced in this case. The patient failed and died. At autopsy the heart, lungs, liver, and spleen were found normal, the stomach showed a large cancer on the posterior wall. In other cases that Gouget mentions the

cancer was situated anteriorly, or had a central situation.

This interesting group of cases teaches the lesson that in generalized oedema of obscure etiology, gastric cancer should be one of the first things thought of, and in all such cases radiography of the stomach should be done, though there are no clinical symptoms pointing to the involvement of this organ.

W. P. C.

THE UNTILLED FIELDS OF PUBLIC HEALTH.

THE increasing importance of public health administration to the welfare of mankind and the breadth of its applicability to human problems give promise of almost unlimited activity in this field in years to come. As one of the chief handicaps in the development of the work of the Public Health Service is the lack of well trained personnel, a survey of its chief departments has been made by Dr. C. E. A. Winslow of the Yale School of Medicine, in his recent address, "The Untilled Fields of Public Health," in order to make known to the profession and also to the student who is endeavoring to decide upon a career the possibilities presented by this field of medical service. Dr. Winslow has outlined the development of the service and emphasizes the importance of five main aspects: (1) the promotion of physical health and efficiency through organized community efforts for the sanitation of the environment; (2) the control of community infections; (3) the education of the individual in principles of personal hygiene; (4) the organization of medical and nursing service for the early diagnosis and preventive treatment of disease, and (5) the organization of social conditions in such a way that each individual may be ensured a standard of living adequate for the maintenance of health.

The first stage in the development of public health service was the attempt to maintain sanitary and healthful environmental conditions. This movement was originated three-quarters of a century ago in London by Sir John Simon; through his efforts were removed the unsanitary accumulations which had kept alive the pestilences of the Middle Ages. In more recent years, the problem of environmental sanitation has been solved by General Gorgas in the build-

ing of the Panama Canal. There is still a great deal to do in this earliest phase of public health work; we need vigorous, systematic, and organized effort to control typhus fever, bubonic plague, and malaria. In this field, the elimination of various diseases in their endemic homes promises to be one of the notable achievements of the future.

From the problems involved in environmental sanitation, health officials have worked into other fields. As water-borne and insect-borne diseases began to be controlled effectively, the question of dealing with maladies spreading by direct contact from one individual to another became a subject of absorbing interest and study. Measles, pneumonia, and influenza have become relatively more important as medical science has gained control over typhoid, cholera, and plague. In the control of community infections the bacteriologist, rather than the sanitary engineer, becomes the leader. The control of these diseases, by the detection of incipient cases and of well carriers, isolation, and bedside infection,—was the chief concern of the public health movement fifteen years ago. We now have another weapon to employ against microbes—the prophylactic or therapeutic use of vaccines and immune sera. By this means, smallpox and typhoid fever have come under control, and only the failure to recognize diphtheria promptly prevents us from controlling that disease equally well with antitoxic serum. Our recent experience with influenza indicates that there is still much to be done in the field of community infections.

A third aspect of the public health program upon which depends the saving of a large number of lives involves the element of personal hygiene and a wide educational campaign. The problem of infant mortality can be solved most satisfactorily by the education of the mother in infant care, feeding, clothing, airing, and bathing. The control of tuberculosis requires more than the provision of a sanitary working environment and control of the consumptive who carelessly spreads the disease; as in the case of infant mortality, our main weapon is personal hygiene, by which the consumptive learns so to conduct his daily life that his own tissues will have the strongest possible resistance to the invading micro-organisms. The teacher of personal hygiene thus becomes a necessary figure in the public health campaign.

In order to make preventive measures effective, it is necessary to reach a larger number of people than ordinarily would be cared for by private practitioners. In this work, the medical school inspector, the school nurse, and the school clinics benefit large numbers of children; for adults there is similar provision in various clinics, such as those for tuberculosis and venereal disease. The organization of medical and nursing service for the early diagnosis and preventive treatment of disease can be brought about by the effective coördination within the profession itself of clinical and laboratory facilities to provide the type of expert service which is furnished by our best hospitals and which no individual private practitioner can supply. This care must be made available not merely for the very poor and very rich, but for the entire community. The best plans for securing these ends must be worked out by the public health worker of the future.

A further field for investigation and reform which can be entered upon by the public health worker for the benefit of a large number of people of this country is the adjustment of social conditions in such a way that a certain standard of living may be possible to all. It is only recently that the evil effects of low social and economic levels have been appreciated sufficiently to arouse active remedial effort. General Gorgas, in order to aid in increasing the general vital resistance of pneumonia among the employees on the Isthmus, considered the raising of wages as one of the most effective weapons. Among the poorer classes, the infant mortality rate is higher and tuberculosis is more prevalent than among those who are able to enjoy a higher standard of living. One of the most important of our post-war reconstruction problems is the adjustment of social machinery so that the normal standard of physical health will not be impaired by poverty.

The foregoing survey of the problems to be met by the Public Health Service indicates the possible expansion of public health activities. In order to make possible this future development, there will be needed many different experts of fundamentally distinct training to contribute their special resources to the common task. Dr. Winslow believes that in addition to minor specialists, there must be at least seven types of highly qualified persons in this field: the physician, the nurse, the bacteriologist, the epidemi-

ologist, the engineer, the statistician, and the social worker. To these public health workers of the future will be entrusted the health and welfare of hundreds of thousands of lives in this country every year.

MEDICAL NOTES.

ROYAL INSTITUTE OF PUBLIC HEALTH IN LONDON.—The Royal Institute of Public Health in London, which suspended meetings during the war, will hold its next annual congress at Brussels from May 20 to 24, inclusive, by invitation of the Burgomaster, M. Adolphe Max. Delegates will be invited from all the universities, municipalities, and other public bodies.

OFFICERS OF THE DIVISION OF SANITATION IN THE BUREAU OF HYGIENE AND PUBLIC HEALTH.—Professor George C. Whipple, of Harvard University, has been appointed director of the division of sanitation in the Bureau of Hygiene and Public Health of the League of Red Cross Societies, and has been granted a leave of absence from Harvard University for the second half year in order that he may go to Geneva in February, returning to Cambridge in September, 1920. This organization will offer exceptional opportunities for sanitary engineers. The Red Cross has been engaged hitherto chiefly in relief work, and will now add to this the work of preventing disease by improving sanitary conditions. Professor Whipple is a member of the engineering firm of Hazen, Whipple, and Fuller, New York City. Another member of this firm, Colonel Francis F. Longley, associate director of the division, has left for Geneva in order to undertake emergency work in the Balkans if typhus fever becomes prevalent there.

WORK OF DR. NOGUCHI.—Dr. Hideyo Noguchi, of the Rockefeller Institute for Medical Research, has gone to Merida in order to carry on confirmatory studies of his discovery of *L. icteroides* and to experiment on a larger scale with the curative properties of a specific serum which he has prepared.

APPOINTMENT OF DR. CRUICKSHANK.—At the University of Aberdeen, Dr. John Cruickshank has been appointed Georgina M'Robert lecturer in pathology. Dr. Cruickshank has been serving

as pathologist to the Crichton Royal Institution.

SCHOOL OF PUBLIC HYGIENE.—There has been established as a separate department of the University of Pennsylvania a school of public hygiene. This department has been under the supervision of the medical school, and was the first school of public hygiene in America. It will be under the direction of Dr. Alexander C. Abbott.

BOSTON AND MASSACHUSETTS.

WEEK'S DEATH RATE IN BOSTON.—During the week ending Jan. 17, 1920, the number of deaths reported was 213 against 395 last year, with a rate of 13.75 against 25.86 last year. There were 34 deaths under one year of age against 47 last year.

The number of cases of principal reportable diseases were: Diphtheria, 51; scarlet fever, 87; measles, 266; whooping cough, 63; tuberculosis, 43.

Included in the above were the following cases of non-residents: Diphtheria, 10; scarlet fever 7; measles, 1; whooping cough, 1; tuberculosis, 8.

Total deaths from these diseases were: Diphtheria, 3; scarlet fever, 3; measles, 2; whooping cough, 2; tuberculosis, 11.

Influenza cases, 23.

EAST BOSTON MEDICAL SOCIETY.—At the fifth annual meeting of the East Boston Medical Society, the following officers were elected for the year 1920: President, J. Danforth Taylor, M.D.; Secretary, Richard H. Houghton, M.D.; Treasurer, A. L. McLaren, M.D.; Vice-President, S. Willard Coy, M. D.; Executive Committee, Robert Bonney, M.D.

OSLER MEMORIAL MEETING.—A meeting in memory of Dr. William Osler was held at the Peter Bent Brigham Hospital on January 20. The speakers were Dr. W. T. Councilman, Dr. Harvey Cushing, Dr. J. H. Pratt, and Dr. E. C. Streeter.

APPOINTMENT OF DR. RICHARD C. CABOT.—Announcement has been made of the appointment of Dr. Richard C. Cabot of Boston to the professorship of social ethics at Harvard University. Dr. Cabot will continue to serve as professor of clinical medicine at the Harvard Medical School and as chief of the

west medical service of the Massachusetts General Hospital.

Dr. Cabot was a member of the class of 1889 at Harvard and of 1892 at the Medical School. From 1895 to 1898 he was visiting physician in Channing House, and in 1898 he began his service with the Massachusetts General Hospital. He has been associated with the Harvard Medical School for more than twenty years; from 1889 to 1903 he was an assistant in medicine; from that time to 1908 an instructor, then assistant professor until 1918, when he became a full professor of clinical medicine. Dr. Cabot is the author of many medical books, including volumes on the clinical examination of the blood, the serum diagnosis of disease, and physical diagnosis and differential diagnosis.

During the war, Dr. Cabot served as major in the Medical Corps at Base Hospital No. 6, the Massachusetts General Hospital Unit situated at Bordeaux. He remained there from July, 1917, until February, 1919, except for a period of five months in the latter part of 1917 and the early part of 1918, when he was detached for service with the Red Cross in Paris. In October, 1918, he was promoted to the rank of lieutenant colonel.

NEW ENGLAND NOTES.

NEW ENGLAND WAR RELIEF FUNDS.—Two of the principal New England War Relief Funds have received contributions amounting to the following sums:

French Orphanage Fund	..\$548,778.23
Italian Fund 319,506.13

NEW ENGLAND ALUMNI SOCIETY OF THE UNIVERSITY OF PENNSYLVANIA.—The annual meeting and dinner of the New England Alumni Society of the University of Pennsylvania was held at the clubhouse of the Boston Athletic Association on Saturday evening, January 17, at seven o'clock.

The speakers on that occasion were Dean William Pepper of the School of Medicine of the University of Pennsylvania; Hugh W. Ogden, lately Judge-Advocate of the Rainbow Division, American Expeditionary Forces; Dean Charles F. Painter of the Tufts College School of Medicine; Dr. Joseph H. Pratt, the prominent internist of Boston, and others.

This was the first meeting of the Society since the World War.

The Massachusetts Medical Society.

THE BOSTON MEDICAL LIBRARY.

RESOLUTIONS ON THE DEATH OF SIR WILLIAM OSLER PASSED AT THE ANNUAL MEETING OF THE BOSTON MEDICAL LIBRARY, JANUARY 13, 1920.

Whereas, in the death of Sir William Osler this Library has suffered the loss of a great friend, who, throughout his career did most generously support and further its development, giving timely encouragement to its founders, inspiring its promoters in the succeeding forty-three years by every means in his power, by treasured advice to its committees, by many treasured gifts for its shelves, by not infrequent visits, more notably, at the dedication of our present building and on the well-remembered occasion of his address on Thomas Linacre; and

Whereas William Osler was the first, and last surviving honorary member on the roll of our Library, in conferring of which distinction in 1911 this Corporation will never cease to take pride;

Be it therefore Resolved, that the officers and Members of the Boston Medical Library record their profound grief and sorrow over the loss of this beloved physician, their friend, one of the rarest, loveliest and best spirits that rolling Time ever pressed from his vintage; exemplar of all that is highest in our humanity, whose sovereign mind, resilient to the last, fertilized Letters and the Sciences through half a century.

Sent to THE BOSTON MEDICAL AND SURGICAL JOURNAL for publication, by vote of the Corporation. W. L. BURRAGE, Secretary.

SOCIETY NOTICES.

NEW ENGLAND ROENTGEN RAY SOCIETY.—The first regular meeting of the reorganized body, now known as the New England Roentgen Ray Society, will be held at the Medical Library, Friday evening, February 13 at 7.30 o'clock.

Dr. Isaac Gerber of Providence will talk on "Some Roentgen Observations on the Mastoid."

The officers of the new society are: Dr. Ralph D. Leonard, President; Dr. John H. Lindsey, Vice-President; Dr. Frederick W. O'Brien, Secretary-Treasurer. The Executive Committee comprises Dr. George W. Holmes, Dr. John H. Lambert, and Dr. L. B. Morrison. FREDERICK W. O'BRIEN, Secretary.

WACHUSETT MEDICAL IMPROVEMENT SOCIETY.—A course in early diagnosis of pulmonary tuberculosis and methods of treatment will be given under the auspices of the society, at the Rutland State Sanatorium, through the cooperation of the medical staff of that institution and of specialists in tuberculosis, practicing in Rutland, at 3.30 p.m. as follows:

January 22. History Taking and Physical Diagnosis. Dr. George N. Lapham.

January 29. Classification of Cases. Demonstration of methods of Physical Diagnosis. Sanatorium Staff.

February 5. General Treatment. Sanatorium Staff.

February 12. Treatment of Hemorrhage and Pneumothorax. Sanatorium Staff.

February 19. Occupational Therapy. Dr. Bayard T. Crane.

February 26. X-ray, Tuberculin, and other Tests, Laboratory Methods and Simple Technique of Sputum Examination. Sanatorium Staff.

The members of the State Sanatorium Staff who will take part in the teaching are: Dr. Ernest B. Emerson, superintendent; Dr. Leon A. Alley, assistant superintendent; Dr. David E. Mann, Dr. Halbert C. Hubbard, Dr. William B. Davidson, and Dr. Mary E. Gaffney.

The object in presenting this course is to promote early diagnosis and control of pulmonary cases, and it will be open to all physicians of both sexes. The facilities at Rutland are ample for illustrating any phase of the subject. Should weather conditions make it desirable to postpone any of the exercises, this will be done.

There will be no charge for tuition.

For enrollment or further information address

DR. RANSOM A. RACE, Secretary, Paxton, Mass.

It is the intention of the Division of Tuberculosis, of the Massachusetts Department of Public Health, to extend the expert service in the State Sanatoria, both in the way of consultation clinics, and also in the manner represented by this notice.

EAST BOSTON MEDICAL SOCIETY.—At a recent meeting at Young's Hotel, the East Boston Medical Society elected the following officers for 1920: President, J. Danforth Taylor, M.D.; vice-president, S. Willard Coy, M.D.; treasurer, A. L. McLaren, M.D.; secretary, Richard Houghton, M.D.

The next meeting will be held at Wolcott Hall, East Boston, Feb. 10, 1920, at 8.15 p.m. Charles L. Scudder, M.D., is the speaker. Certain Problems in the Surgery of the Diseases of the Stomach is the topic.

RICHARD HOUGHTON, M.D., Secretary.

SUFFOLK DISTRICT MEDICAL SOCIETY, SURGICAL SECTION.—The next meeting of the Surgical Section, Suffolk District Medical Society, will be held on February 18, 1920, at 8.15 p.m., at the Boston Medical Library. Dr. John A. Hartwell, Clinical Professor of Surgery, Cornell University Medical College, and Director of Surgery, Bellevue Hospital, will present a paper. Subject, "Abscess of the Lung." A discussion will follow the reading of the paper. It is hoped that all those present will participate.

RICHARD H. MILLER, Secretary.

THE NEW ENGLAND DERMATOLOGICAL SOCIETY.—The New England Dermatological Society will hold its quarterly meeting at the Massachusetts General Hospital, Out-Patient Building, on Wednesday, February 11, 1920, at 3.30 p.m.

Members of the medical profession are invited to attend. E. LAWRENCE OLIVER, Secretary.

NOTICE.

MASSACHUSETTS GENERAL HOSPITAL.—A meeting of the Out-Patient Medical Staff will be held in the Lower Out-Patient Department Amphitheatre on February 11, at 12, noon.

Program is as follows:—

1. Observations on Various Types of Diabetes. Dr. F. Gorham Brigham.
2. Pyelitis. Dr. E. G. Crabtree.
3. Some Out-Patient Hands. Dr. Torr W. Harmer.

F. A. WASHBURN, Resident Physician.